Case Study

Treatment of a Glomus Tumor

Institution: University of Pittsburgh Medical Center, Pittsburgh, PA
Neurosurgeon: Douglas Kondziolka, MD
Medical Physicist: Josef Novotny, PhD
Radiation Oncologist: John C. Flickinger, MD
Patient: 72-year-old female
Diagnosis: Left glomus jugulare tumor
Treatment: Gamma Knife® radiosurgery using 14 isocenters. Collimators included 8mm, 16mm, and 16mm with segmental blocking; margin dose of 13Gy at the 50% isodose line.

Gamma Knife® surgery, sometimes referred to as stereotactic radiosurgery, is a non-invasive method for treating brain disorders. It is the delivery of a single, high dose of irradiation to small and critically located intracranial volumes through the intact skull. Gamma Knife surgery is preferred for its accuracy, efficiency and therapeutic response. There are currently more than 250 Gamma Knife centers worldwide and approximately 500,000 patients have undergone Gamma Knife surgery. Now with the introduction of Leksell Gamma Knife® Perfexion, new levels of performance and efficiency are brought to the field of stereotactic radiosurgery.
Treatment of a Glomus Tumor with Leksell Gamma Knife® Perfexion™

Patient diagnosis and history
This 72-year-old woman noted pulsatile tinnitus approximately seven months prior to radiosurgery. She also noted left-sided neck stiffness and some decrease in hearing. Voice and swallowing function remained normal. She was referred for Gamma Knife radiosurgery using the Perfexion unit, given the inferior extent of the tumor.

Treatment
Dr. Douglas Kondziolka, Peter J. Jannetta, Professor and Vice-Chairman of Neurological Surgery at UPMC Presbyterian, met with the patient to discuss the options of continued observation, surgical resection with and without embolization, fractionated radiation therapy or Gamma Knife radiosurgery. The patient chose Gamma Knife surgery.

Using stereotactic high-resolution, contrast-enhanced fat suppression magnetic resonance imaging, the tumor was identified, measured and contoured. A radiosurgical plan was constructed using 14 isocenters including selected segmental blocking inferiorly. A margin dose of 13 Gy was selected using the 50% isodose line. Eight isocenters used the 8 mm collimator and six used the 16 mm collimator, one with sector blocking. The tumor volume measured 13.2 ml.

The complete treatment procedure only lasted a little more than a half hour, including patient setup and all positioning and collimator changes.

Conclusion
Due to the inferior extent of the tumor (down to the second cervical vertebra), the advantages of Leksell Gamma Knife Perfexion were demonstrated. The patient underwent the procedure with efficiency and was discharged home from the hospital the same morning. There have been no adverse effects since Gamma Knife surgery.

FACT:
With their first patient treated in 1987, UPMC Presbyterian was the first center to use Leksell Gamma Knife clinically in North America.

"These kind of glomus tumors have previously been complex to manage due to their inferior extent. As the tumor is narrow and located with several critical structures in near proximity, at UPMC we prefer to use Gamma Knife surgery to obtain the most conformal dose distribution. With Perfexion, we can now handle these tumors with greater simplicity benefiting both patient and staff."

Dr. Douglas Kondziolka
Professor and Vice-Chairman of Neurological Surgery, UPMC Presbyterian